

REMARKS

Claims 1 through 13 are pending in this Application. Claims 1 and 7 have been amended. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, example, Figs. 1 through 3 and the related discussion thereof in the written description of the specification, notably page 4, line 16 through page 6, line 3. Applicants submit that the present Amendment does not generate any new matter issue.

Claims 1 and 4 through 6 were rejected under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al.

In the statement of the rejection, the Examiner admitted that Matsuda et al. neither disclose nor suggest the use of a connecting conductive layer as a stress absorbing layer with a lower hardness than the other layer. In fact, neither do Brady et al. Nevertheless, the Examiner asserted that Brady et al. disclose a connecting conductor identifying elements 51-55 of different layers, including, a soft layer such as aluminum (52 in Fig. 3). The Examiner is **wrong** because element 50 is a bump structure according to Brady et al. (column 7, line 36) and the aluminum layer 52 is part of that bump structure 50. The Examiner then concluded:

...to incorporate at least one of the conductor layers being formed as a stress absorbing layer having lower hardness than the other layer as taught by Brady et al. so that the mechanical stress and chip cracking defects can be reduced and bonding can be improved in Matsuda et al.'s device. (Ultimate paragraph on page 4 of the August 6, 2003 Office Action.)

This rejection is traversed as factually and legally erroneous for several reasons.

Insufficient Facts

As previously pointed out, what the Examiner calls a "a connecting conductor" in the device disclosed by Brady et al. is **not** a connecting conductor as one having ordinary skill in the art would have understood. Rather, layers 51-55 of the device disclosed Brady et al. form part of a **bump** structure 50 (column 7 of Brady et al., line 36). If anything, the bump structure 50 would be similar to bumps 31 of Fig. 1 of Matsuda et al., not what the Examiner has identified as the connecting conductor in via 7 and connects layer 29 to bump 31 (first paragraph on page 3 of the August 6, 2003 Office Action).

Secondly, in the Examiner's obviousness conclusion, the Examiner speaks of reducing mechanical stress. **But where is that taught in the prior art? Thus, the Examiner's conclusion is without the requisite factual basis.**

At any rate, claim 1 has been amended to clarify that the connecting conductors do not include wiring layers and the bumps as external terminals. This being the case, even if the applied references are combined as suggested by the Examiner, and that is a big if with which Applicants do not agree, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

There is no Motivation

In order to establish the requisite realistic motivation, the Examiner must point to a **source** in the applied prior art for **each** claim limitation and a **source** in the applied prior art for the requisite **motivational** element. *Smiths Industries Medical System v. Vital Signs Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999). More to the point, the Examiner is required to make a "thorough and searching" factual inquiry and, based upon that factual inquiry and, based upon that

factual inquiry, explain **why** one having ordinary skill in the art would be realistically impelled to modify particular prior art, in this case the semiconductor device disclosed by Matsuda et al. to arrive at the claimed invention. *In re Lee*, 237 F.3d 1338, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002). Such a factual inquiry requires clear and particular factual findings as to a specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify the semiconductor device disclosed by Matsuda et al. to arrive at the claimed invention. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.* 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). Merely identifying wherein features of a claimed invention are perceived to reside in disparate references does not establish the requisite motivation. *In re Kotzab, supra*; *Grain Processing Corp. v. American-Maize Products Co.*, 840 F.2d 902, 5 USPQ2d 1788 (Fed. Cir. 1988). Rather, a **specific reason** must be offered based upon **facts** to support the asserted motivation--not generalizations. *Ecolochem Inc. v. Southern California Edison, Co., supra*; *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998).

In applying the above legal tenets to the exigencies of this case, Applicants submit that the requisite motivation element has **not** been established. Specifically, as previously pointed out, the relied upon elements in the structure disclosed by Brady et al. form part of a bump structure 50--not a connecting conductor. The Examiner has **not** provided any factual basis upon which to predicate the conclusion that of one having ordinary skill in the art would somehow have been realistically lured to impress the bump structure disclosed by Brady et al. on the connecting conductor disclosed by Matsuda et al. *In re Lee, supra*. In fact, it is not apparent and the Examiner has **not** even pointed

out wherein Matsuda et al. disclose or suggest that the use of **different materials** for the connecting conductor. *In re Lee, supra*.

Furthermore, Matsuda et al. do not disclose replacing a layer with aluminum. Matsuda et al. simply disclosed the concept of employing aluminum because it is softer than copper and does not work harden as much as copper. **The Examiner has failed to point out wherein either of the applied references discloses or suggests the concept of providing a stress reducing absorbing layer.** *In re Lee, supra*. Moreover, the Examiner's conclusion quoted above which appears in the ultimate paragraph on page 4 of the August 6, 2003 Office Action is completely devoid of any factual basis. *In re Lee, supra*. The Examiner's reasons are found only in Applicants' disclosure. However, Applicants' disclosure is forbidden territory upon which the Examiner may trespass for excavating the motivational element. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985).

Further, as previously pointed out, independent claim 1 has been clarified by reciting that the connecting conductors do not include wiring layers and the bumps as external terminals. Accordingly, as previously pointed out, even if the applied references are combined, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, *supra*.

Indicium of Nonobviousness

The Court of Appeals for the Federal Circuit has consistently held that the **problem** addressed and solved by a claimed invention **must be given consideration** as an indicium of **nonobviousness**. *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 28 USPQ2d 1333 (Fed. Cir. 1993); *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989);

Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 7 USPQ2d 1315 (Fed. Cir. 1988); *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (CCPA 1975). As disclosed in the second full paragraph on page 2 of the written description of the specification, the present invention addresses and solves the problem of cracking caused by stress imposed upon connection conductors due to a difference in coefficients of linear expansion between a semiconductor chip and sealing resin. It is **not** apparent and the Examiner has **not even attempted** to identify wherein either of the applied references expresses any recognition of this problem much less offers a solution thereto. Under such circumstances, the problem addressed and solved by the present invention constitutes a potent indicium of **nonobviousness** which the Examiner cannot legally ignore.

Conclusion

Based upon the foregoing it should be apparent that a *prima facie* basis to deny patentability to the claimed invention has not been established for lack of the requisite factual basis and want of the requisite realistic motivation. Moreover, upon giving due consideration to the cracking problem addressed and solved by the claimed invention, due to the difference in coefficients of linear expansion between the chip and sealing resin, which problem is neither appreciated nor addressed by the applied prior art, the conclusion appears inescapable that one having ordinary skill in the art would **not** have found the claimed invention **as a whole** obvious within the meaning of 35 U.S.C. §103. *Jones v. Hardy*, 727 F.2d 1524, 220 USPQ 1021 (Fed. Cir. 1984).

Applicants, therefore, submit that the imposed rejection of claims 1 and 4 through 6 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

Claim 7, 8 and 11 through 13 were rejected under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and Chakravorty.

This rejection is traversed for reasons which parallel those advanced in traversing the imposed rejection of claim 1 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. Specifically, the Examiner made a **clear factual error** in determining that Brady et al. disclose a connecting conductor having a plurality of metal layers identified as layers 51-55; whereas, Brady calls that plurality of layers a **bump** structure 50 (column 6, line 36). The difference between a connecting conductor and bump structure would have been apparent to one having ordinary skill in the art.

Moreover, the Examiner has **not** provided the requisite factual basis to support the conclusion that one having ordinary skill in the art would somehow have been realistically impelled to provide layers of different materials in the connecting conductor structure of Matsuda et al., particularly since Matsuda et al. do not mention the use of different types of materials.

Further, what Brady et al. teach is to replace copper with aluminum in a **bump** structure, because aluminum is softer and is less deformable. What that has to do with the **connecting conductor** of Matsuda et al. has yet to be established on this record.

In addition, the Examiner's reason for combining the references, as expressed in the paragraph bridging pages 8 and 9 of the August 6, 2003 Office Action, lacks the requisite factual basis in the applied prior art. The only justification for the Examiner's proposed combination of references is found in Applicants' disclosure which, of course, is forbidden territory to the Examiner. *Panduit Corp. v. Dennison Mfg. Co., supra*. The additional reference to Chakravorty does not cure the argued deficiencies in the attempted combination of Matsuda et al. and Brady et al.

In addition, claim 7 has been clarified by reciting that the connecting conductors do not include wiring layers and the bumps as external terminals. This being the case, it should be apparent that even if all of the references are combined as suggested by the Examiner, and again Applicants do not agree that the requisition motivational element has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp., supra.*

Moreover, the Examiner has not attempted to identify wherein any of the applied references discloses an appreciation of the cracking problem due to a difference in coefficients of linear expansion between the chip and resin, much less a solution thereto, which is the problem addressed and solved by the claimed invention. Accordingly, the problem addressed and solved by the claimed invention is entitled to consideration as a potent indicium of **nonobviousness**. *North American Vaccine, Inc. v. American Cyanamid Co., supra.; Northern Telecom, Inc. v. Datapoint Corp., supra.; In re Newell, supra.; Diversitech Corp. v. Century Steps, Inc., supra.; In re Nomiya,, supra.*

Based upon the foregoing Applicants submit that the Examiner did not establish a *prima facie* basis to deny patentability to the claimed invention under 35 U.S.C. §103 for the lack of the requisite factual basis and want of the requisite realistic motivation. Moreover, upon giving due consideration to the problem addressed and solved by the claimed invention as a potent indicium of **nonobviousness**, which the Examiner must, the conclusion appears inescapable by one having ordinary skill in the art would **not** have found the claimed invention **as a whole** obvious within the meaning of 35 U.S.C. §103. *Jones v. Hardy, supra.*

Applicants, therefore, submit that the imposed rejection of claims 7, 8 and 11 through 13 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and Chakravorty is not factually or legally viable and, hence, solicit withdrawal thereof.

Claims 2 and 3 were rejected under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and Akagawa.

Claims 9 and 10 were rejected under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al., Chakravorty and Akagawa.

Each of the above rejections of claims 2 and 3 and of 9 and 10 is traversed. Specifically, claims 2 and 3 depend from independent claim 1 and claims 9 and 10 depend from independent claim 7. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 1 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and the imposed rejection of claim 7 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and Chakravorty. The additional reference to Akagawa does not cure the argued deficiencies in the attempted combination of references to defeat the patentability of claims 1 and 7.


Applicants, therefore, submit that the imposed rejection of claims 2 and 3 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al. and Akagawa and the imposed rejection of claims 9 and 10 under 35 U.S.C. §103 for obviousness predicated upon Matsuda et al. in view of Brady et al., Chakravorty and Akagawa are not factually or legally viable and, hence, solicit withdrawal thereof.

Based upon the foregoing Applicants submit that the imposed rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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